What is claimed is:

1. A regulator for use with fuel cells, comprising:

a body having a primary port for being supplied with a fuel gas and a secondary port for discharging the fuel gas;

a valve head displaceably disposed in said body for being unseated from and seated on a valve seat for opening and closing a fluid passage which interconnects said primary port and said secondary port;

a first diaphragm and a second diaphragm which are disposed in said body and spaced a predetermined distance from each other, said first diaphragm being flexible under the pressure of pilot air as an oxidizing agent supplied to a pilot chamber, said second diaphragm being flexible under the pressure of the fuel gas flowing through said fluid passage;

a rod for displacing said valve head, said first diaphragm, and said second diaphragm in unison with each other upon flexing of said first and second diaphragms;

a first spring engaging said valve head for normally urging said valve head in a direction to be seated on said valve seat; and

a second spring disposed in said pilot chamber for normally urging said valve head in a direction to move away from said valve seat;

wherein the spring force of said first spring is set to a value greater than the spring force of said second spring,

and said valve head is seated on said valve seat when the pilot air is not supplied to said pilot chamber.

2. A regulator for fuel cells according to claim 1, wherein the ratio of pressure-bearing areas of said first diaphragm and said second diaphragm is set to a value in the range from about 2 : 1 to about 4 : 1.

3. A regulator for fuel cells according to claim 2, wherein the ratio of the pressure-bearing areas of said first diaphragm and said second diaphragm is set to a value in the range from 3.1 : 1 to 3.2 : 1 by being corrected by the spring force of said first spring for normally urging said valve head toward said valve seat.

4. A regulator for fuel cells according to claim 1, further comprising a back pressure chamber defined at an end of said rod for acting in a direction to cancel out a pressure applied to said valve head, and an aspirator chamber defined between said second diaphragm and said valve head for developing a pressure lower than a pressure in said secondary port due to a suction caused by a nozzle, said rod having a communication hole defined therein which provides fluid communication between said back pressure chamber and said aspirator chamber.

5. A regulator for fuel cells according to claim 1,

further comprising a valve seat member which has said valve seat, said valve seat member having a tapered surface providing a fluid passage cross section which progressively spreads along the fluid passage communicating with said secondary port.

6. A regulator for fuel cells according to claim 5, further comprising an aspirator holder, said aspirator holder and said second diaphragm defining an aspirator chamber therebetween, said aspirator holder having a slanted surface, said fluid passage cross section being provided so as to progressively spread between said slanted surface of said aspirator holder and said tapered surface of the valve seat member.

7. A regulator for fuel cells according to claim 1, wherein said valve head is mounted on a guide member connected to an end of said rod, said valve head being guided by a valve head guide member having a guide sleeve which surrounds an outer circumferential surface of the guide member except for said valve head.

8. A regulator for fuel cells according to claim 7, wherein a fluororesin coating is applied to a sliding region of the outer circumferential surface of the guide member and the guide sleeve.

9. A regulator for fuel cells according to claim 7, wherein a pair of sealing members spaced a predetermined distance from each other axially of the guide member which is cylindrical is disposed between said guide member and said guide sleeve.

10. A regulator for fuel cells according to claim 9, wherein said pair of sealing members comprises an O-ring disposed closely to said valve heat and a Y-gasket disposed remotely from said valve seat.

11. A regulator for fuel cells according to claim 9, wherein an annular space communicating with a communication hole extending axially of said rod is defined between said sealing members.

12. A regulator for fuel cells according to claim 7, wherein said valve head guide member is separate from said body.

13. A regulator for fuel cells according to claim 12, wherein said valve head guide member has a hole defined centrally therein which is contiguous to said guide sleeve, said hole being closed by a removable closure member.

14. A regulator for fuel cells according to claim 1, further comprising a leaf spring disposed in said pilot

chamber for applying a sliding resistance to said first diaphragm, said leaf spring having a leg with a curved portion held in contact with a cylindrical bushing of stainless steel which is mounted in said body.

15. A regulator for fuel cells according to claim 14, wherein said leaf spring has an outer surface coated with at least a diamond-like carbon coating.

16. A regulator for fuel cells according to claim 1, further comprising a first adjustment member and a second adjustment member for adjusting in two stages the spring force of the second spring disposed in said pilot chamber.

17. A regulator for fuel cells according to claim 1, further comprising an upper retainer and a lower retainer which are connected to said rod and hold face and reverse sides, respectively, of said first diaphragm, said body having an annular recess defined in an inner wall surface of said body for allowing a bent outer circumferential edge of said lower retainer to enter therein.

18. A regulator for fuel cells according to claim 16, wherein said first adjustment member comprises a first adjustment screw threaded in a threaded hole defined in an end of said body, and said second adjustment member comprises a second adjustment screw threaded in a threaded

hole defined centrally in said first adjustment screw.

19. A regulator for fuel cells according to claim 1, wherein said regulator is incorporated in a fuel cell system having a fuel cell stack having an anode and a cathode;

said regulator being mounted in a pressure controller disposed between a fuel supply for supplying a fuel to said anode and said anode;

said pressure controller being responsive to the pressure of air supplied as a pilot pressure through a bypass passage, for discharging a pressure to the secondary port which has been regulated depending on said pilot pressure.

20. A regulator for fuel cells according to claim 19, wherein said fuel cell system is mounted on an automobile.